

As I explore in Chapter 2, recognizing that the goal of many scientific inquiries is to describe the mechanism responsible for the phenomenon of interest provides a different perspective on many aspects of scientific inquiry. Diagrams often provide the most fruitful way of representing a mechanism, in which case scientists may relate the mechanism to the phenomenon of interest by mentally simulating its operation. In part this involves a reductionistic strategy of decomposing the mechanism into its parts and operations, but equally significant is figuring out how these are organized to work together and how various environmental conditions affect the mechanism's functioning. Finally, although traditional philosophy of science has had little to say about the process of discovery, when the focus is on mechanisms we can set out what the challenge of discovery is and analyze typical experimental strategies – strategies that figured prominently in discovering cell mechanisms.

2. THE ORGANIZATION OF SCIENCE INTO DISCIPLINES²

Although a central feature of my discussion will be the discovery of cell mechanisms, my broader focus is on the establishment of cell biology as a discipline. In 1940 no one would have listed cell biology when identifying scientific disciplines. By 1970 it was a well-established discipline. My goal is to trace and account for this change. First, though, a preliminary issue must be addressed. The word *discipline* is familiar enough, but what exactly is a scientific discipline? In the disciplines that analyze science (philosophy of science, history of science, and sociology of science, which are collectively referred to as *science studies*), a variety of criteria have been offered.

Perhaps the most common way in which people identify disciplines is in terms of the objects they investigate. Thus, astronomy is described as the study of suns, planets, and the like, whereas psychology investigates mental activities or behaviors. Dudley Shapere captured this feature of our ordinary conception of disciplines when he introduced the term *domain* for “the set of things studied in an investigation” (Shapere, 1984, p. 320; for his classic treatment of domains, see Shapere, 1974). Shapere's conception of a domain is more sophisticated than the lay conception, however, for he argued that domains are not simply presented to scientists but result from their decision as to what items (his term for the constituents of domains) to group together to constitute a domain. Thus, he showed how during the nineteenth century chemists made facts about basic elements a domain for study, because they

² The discussion in this section draws in part upon Bechtel (1986a).